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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/664,877

09/22/2003

Su Tao

TAOS3010/EM

4224

23364

7590

04/04/2005

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EXAMINER

ROSE, KIESHA L

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 04/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary

Application No.

10/664,877

Applicant(s)

TAO, SU

Examiner

Kiesha L. Rose

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 16-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the election filed 3 March 2005.

Election/Restrictions

Claims 16-19 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected method of making a semiconductor device, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 3 March 2005.

Applicant's election without traverse of claims 1-15 in the reply filed on 3 March 2005 is acknowledged.

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

Figs. 7a and 7b, # 64

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as

either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description:

Figs. 7a and 7b, #641

Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the chromium layer must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

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Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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Claims 1-2 and 4-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Huang et al. (U.S. Publication 2002/0113308).

Huang discloses a ball grid array (Fig. 1) that contains a substrate unit (20) having an upper surface and a lower surface opposed to the upper surface, a chip (21) having an active surface and a back surface opposed to the active surface, a plurality of conductive devices (wires (22)) electrically connecting the active surface of the chip and the upper surface of the substrate and the back surface of the chip is attached on the upper surface of the substrate, a plurality of pellets (230) formed on the upper surface of the substrate and surrounding the chip, a heat spreader unit (231) disposed above the chip and the pellets, wherein the heat spreader is connected to the pellets, a plurality of solder balls (24) formed on the lower surface of the substrate and an encapsulation unit (25) encapsulating the chip, conductive wires, pellets and heat spreader unit, where the pellets are thermally conductive bumps, thermally conductive adhesive bodies, thermally conductive adhesive bodies with metal powder therein or electrically conductive bumps.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang in view of Bertin et al. (U.S. Patent 6,294,406).

Huang discloses all the limitations except for the conductive device to be conductive bumps. Whereas Bertin discloses a chip package (Fig. 10) that contains a substrate (140) and a chip (130) with conductive bumps that connect the chip to the substrate and where the conductive bumps are metal bumps or electrically conductive adhesive bodies. (Column 4, lines 62-65) Conductive bumps are used to provide an electrical pathway between the substrate and the active circuit layer of the chip. (Column 4, lines 54-56) Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Huang by incorporating conductive bumps as the conductive devices to provide an electrical pathway between the substrate and the active circuit layer of the chip as taught by Bertin.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huang in view of Chen et al. (U.S. Patent 6,649,991).

Huang discloses all the limitations except for the substrate to be organic with a mask. Whereas Chen discloses a semiconductor package (Fig. 1) that contains an organic substrate with a mask layer (110) and grounding contacts; traces in the substrate. The substrate is an organic substrate with a mask to make the substrate extremely flat and with the traces (grounding contacts) formed by the mask the substrate is even and flat, which makes better placement of the chip and greater adhesion between chip and substrate. (Column 2, lines 6-13) Therefore it would have

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been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Huang by incorporating an organic substrate with a mask to make the substrate extremely flat and with the traces (grounding contacts) formed by the mask the substrate is even and flat, which makes better placement of the chip and greater adhesion between chip and substrate as taught by Chen.

Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang in view of McMillan et al. (U.S. Patent 5,650,593).

Huang discloses all the limitations except for a leadframe and lead less lead frame. Whereas McMillan discloses a chip carrier package (Fig. 9) that contains a substrate (12) which can be a leadframe or a leadless lead frame and a heatsink (16). Whereas with the substrate being a leadless leadframe will reduce the amount of heat that will be carried away from the chip by the lead frame itself. (Column 3, lines 18-22) Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Huang by incorporating a leadframe and leadless leadframe to reduce the amount of heat that will be carried away from the chip by the lead frame itself as taught by McMillan.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huang in view of Bernier et al. (U.S. Patent 6,251,707).

Huang discloses all the limitations except for a chromium layer on the heat sink. Whereas Bernier discloses a chip carrier (Fig. 1) that contains a heat sink (118) with a chromium layer formed thereon. The chromium layer is formed for chromate conversion on the heat sink and for oxidation. (Abstract) Therefore it would have been obvious to

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one having ordinary skill in the art at the time the invention was made to modify the device of Huang by incorporating a chromium layer on the heat sink for chromate conversion and for oxidation as taught by Bernier.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kiesha L. Rose whose telephone number is 571-272-1844. The examiner can normally be reached on M-F 8:30-6:00 off 2nd Mondays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KLR
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